

Grade 10 MYP

Unit 2 Geometry

A: Angle Properties of Circles

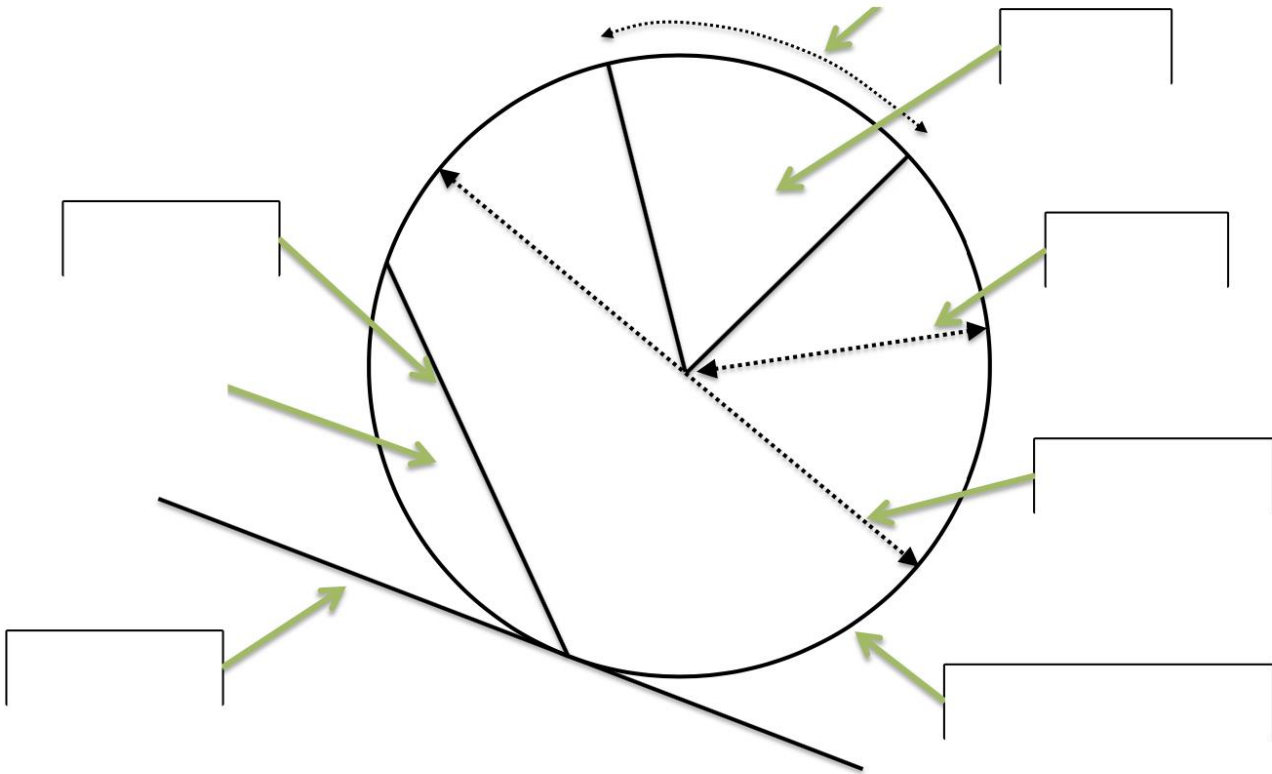
Name _____

A. Angles in circles	<u>1</u>	Review: Angles in parallel lines
	<u>2</u>	Angles in quadrilaterals (parallelogram, trapezia, kites etc)
	<u>3</u>	Triangles in circles
	<u>4</u>	Circle Theorems and quadrilaterals
	<u>5</u>	Angles in the same segment
	<u>6</u>	Tangents and Radii
	<u>7</u>	Alternate Segment Theorem
	<u>8</u>	Review

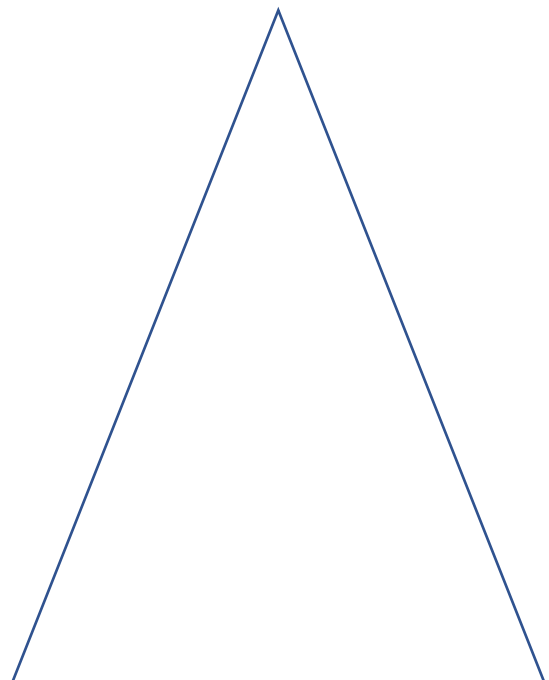
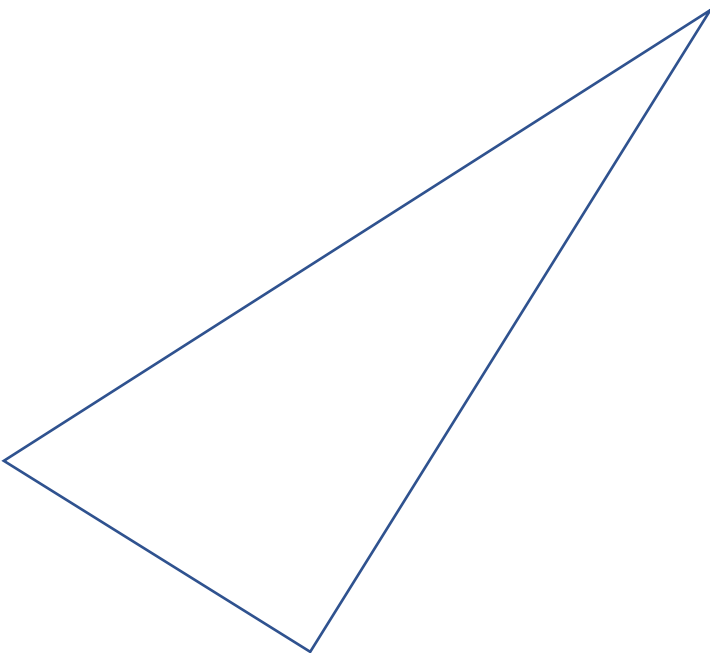
Write key facts here:

(3) Triangles in circles

Do now

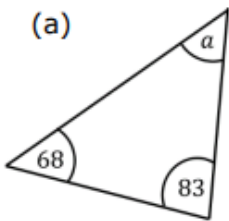


Using a protractor measure the angles in the triangles

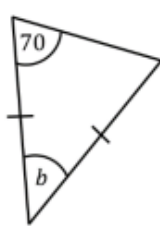


Find the missing angles.

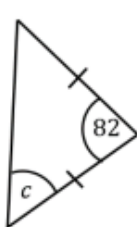
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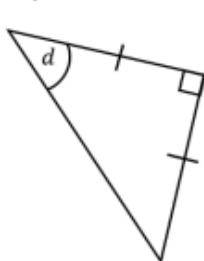
(b)



(c)

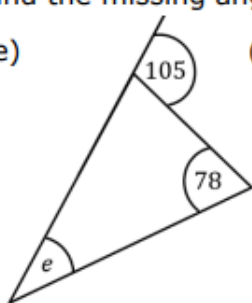


(d)

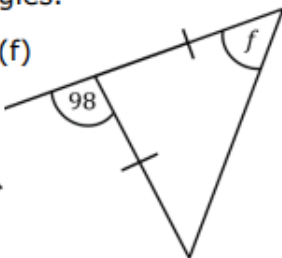


Find the missing angles.

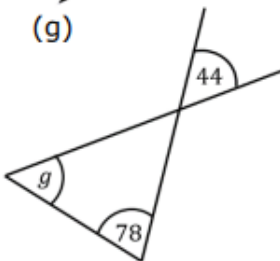
(e)



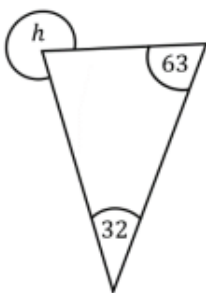
(f)



(g)

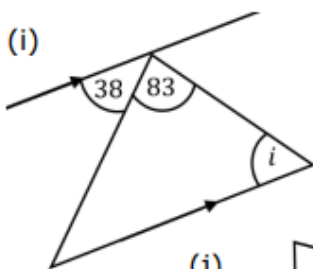


(h)

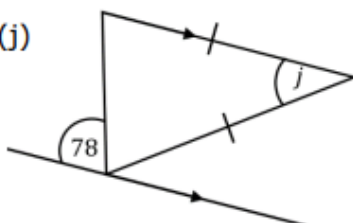


Find the missing angles.

(i)

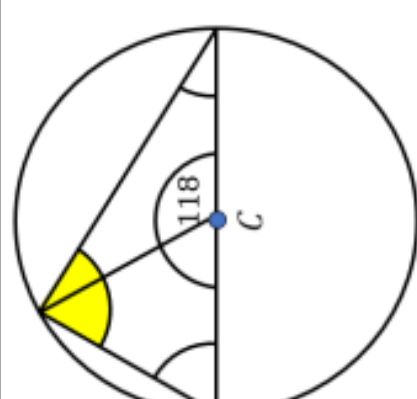
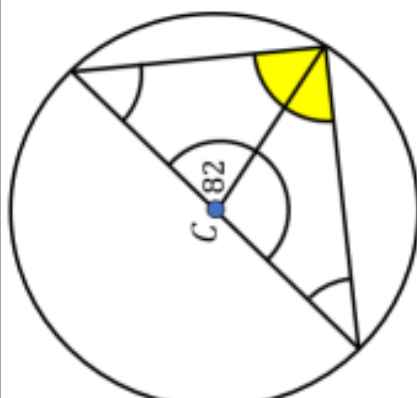
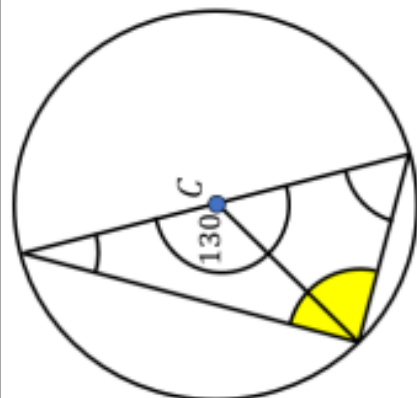
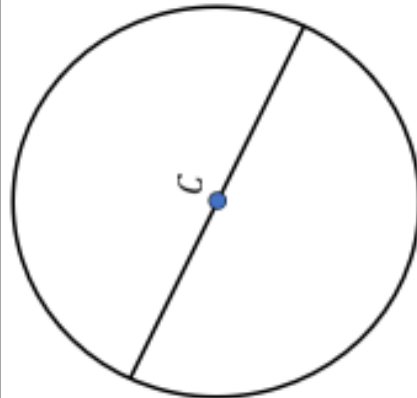


(j)



Investigating Triangles Inside Circles

The first three diagrams show two joined isosceles triangles that fit together inside a semicircle. Calculate all marked angles and write down what you notice about the shaded angle. In the final diagram, choose your own angles and test your theory.

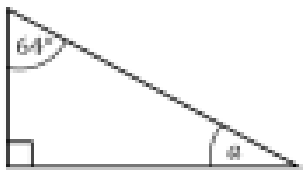
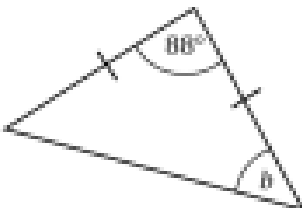
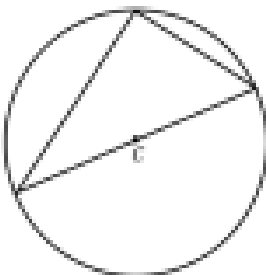
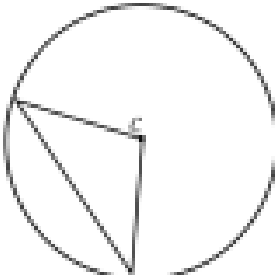
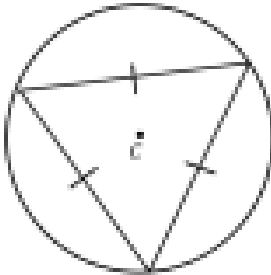
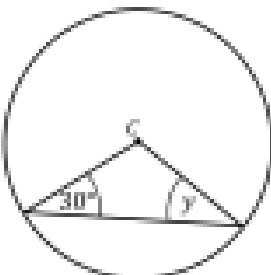
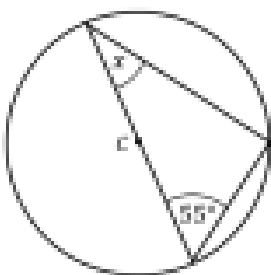
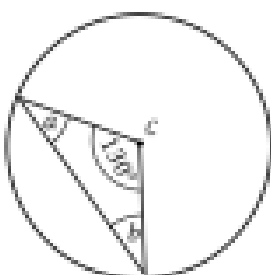
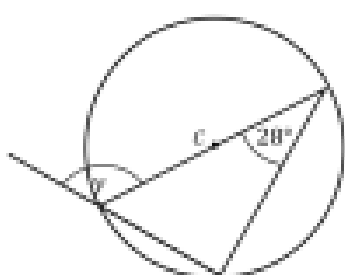
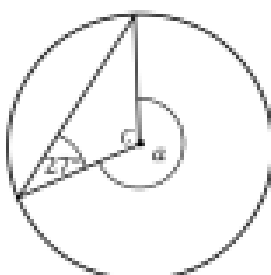
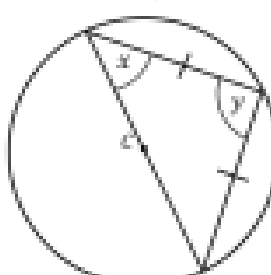


What did you notice?

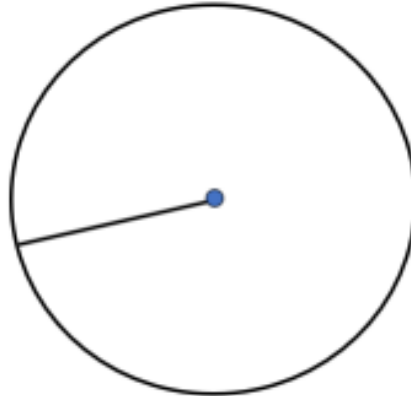
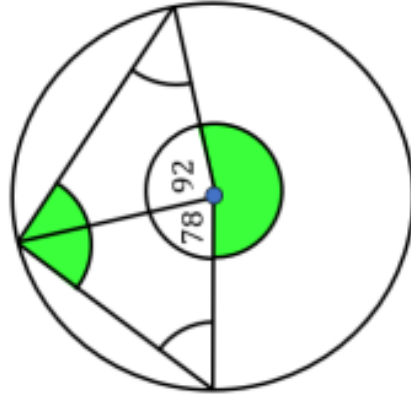
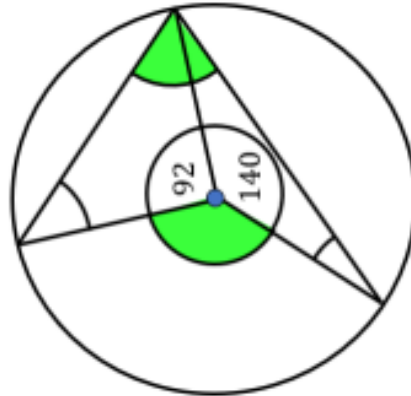
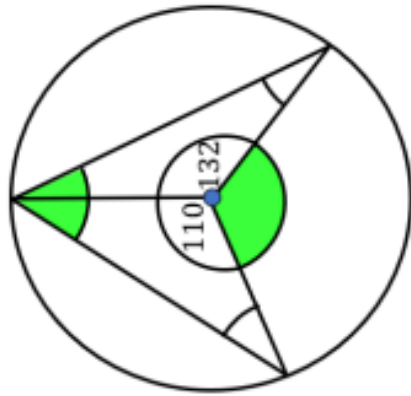
Right-Angle in a Semi-Circle Practice Grid				
(a)	(b)	(c)	(d)	
(e)	(f)	(g)	(h)	
(i)	(j)	(k)	(l)	
			Find y in terms of x	

Isosceles Triangle in a Circle Practice Grid				
(a)	(b)	(c)	(d)	
(e)	(f)	(g)	(h)	
(i)	(j)	(k)	(l)	
				Find y in terms of x

(4) Circle Theorems and Quadrilaterals
Do now

(a)	(b)	(c)
Find the missing angle a. 	Find the missing angle b. 	Find the missing angles c and d. 
(d)	(e)	(f)
What type of triangle is inside the circle? 	What type of triangle is inside the circle? 	What type of triangle is inside the circle? 
(g)	(h)	(i)
Find the missing angle y. 	Find the missing angle x. 	Find the missing angles a and b. 
(j)	(k)	(l)
Find the missing angle y. 	Find the missing angle a. 	Find the missing angles x and y. 

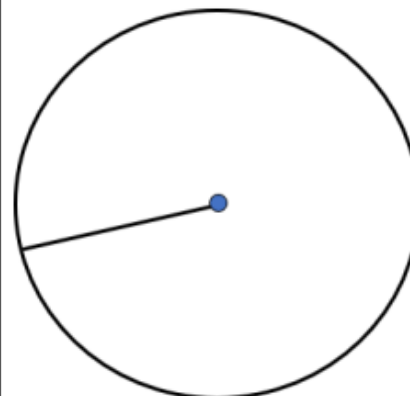
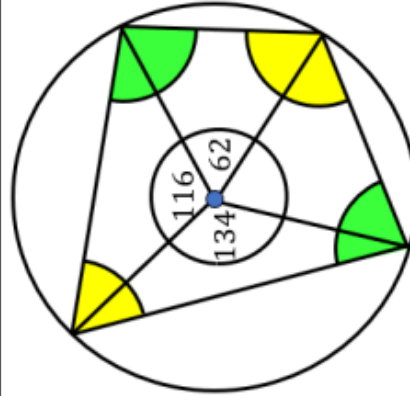
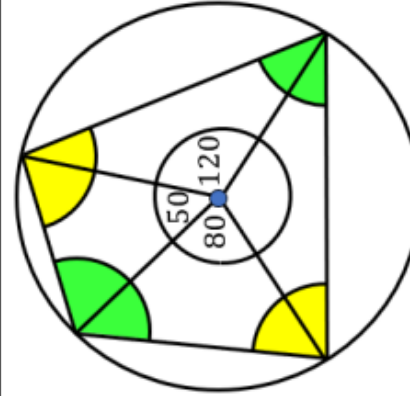
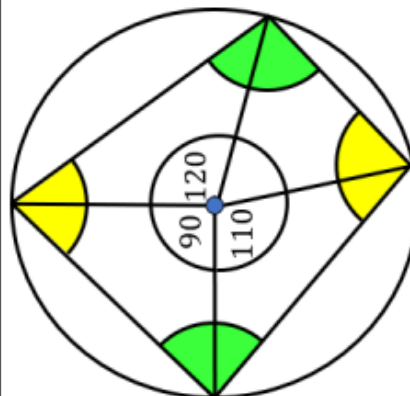
The next three diagrams show two joined isosceles triangles that fit together inside a full circle. Calculate all marked angles and write down what you notice about the shaded angles. In the final diagram, choose your own angles and test your theory.



What did you notice?

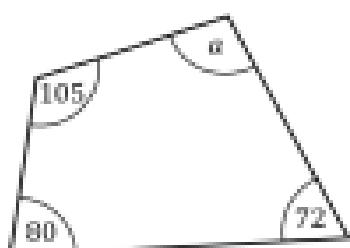
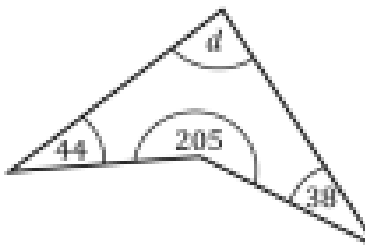
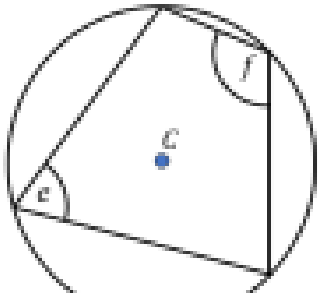
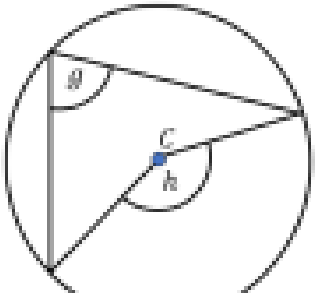
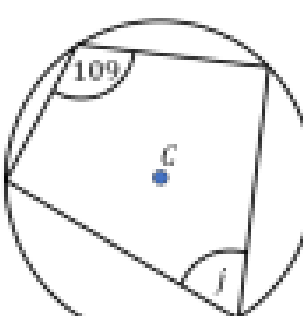
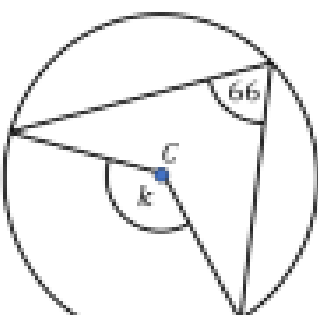
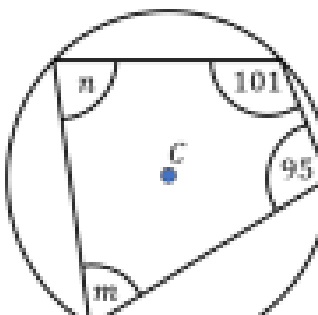
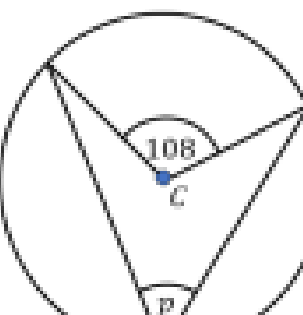
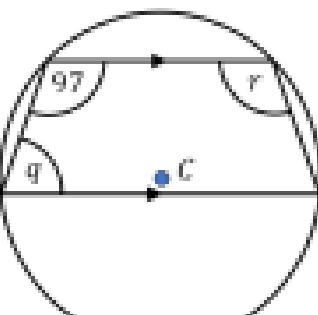
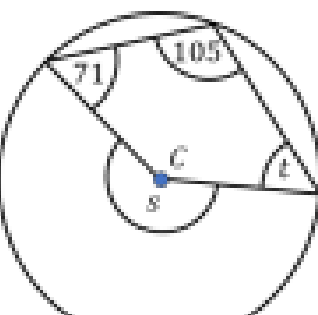
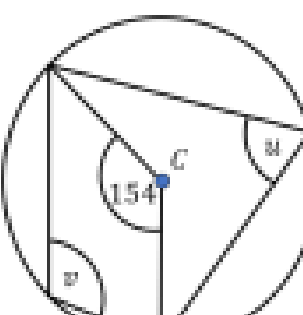
More Investigating Triangles Inside Circles

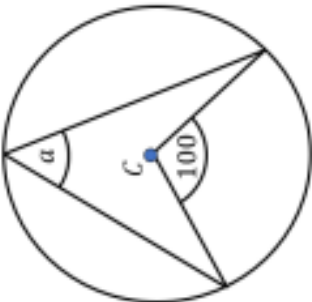
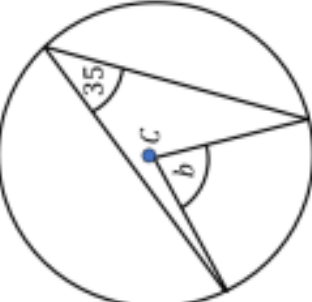
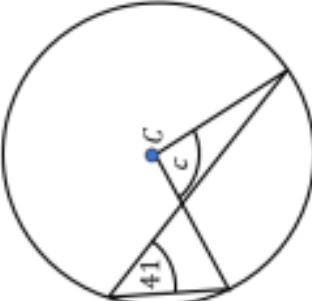
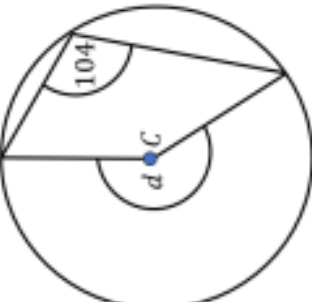
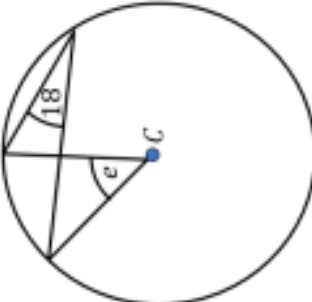
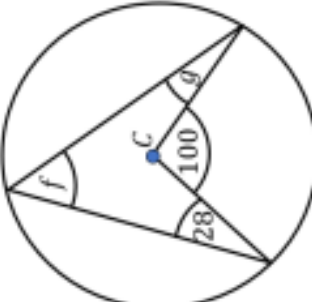
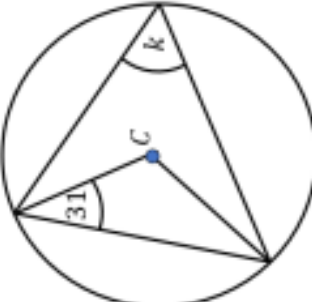
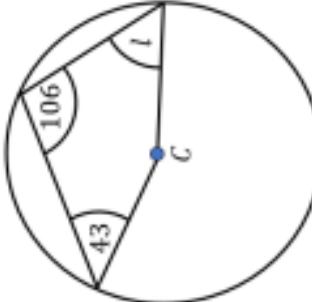
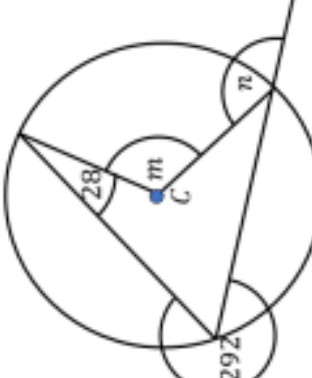
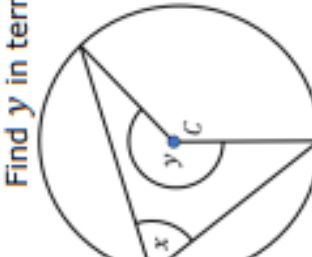
The first three diagrams show four joined isosceles triangles that fit together inside a circle. Calculate all marked angles and write down what you notice about the shaded angles. In the final diagram, choose your own angles and test your theory.



What did you notice?

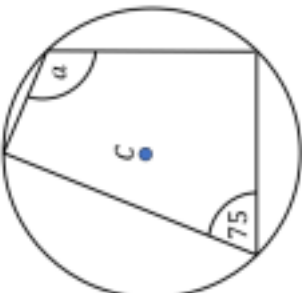
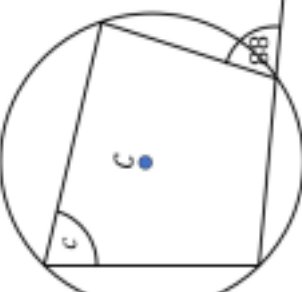
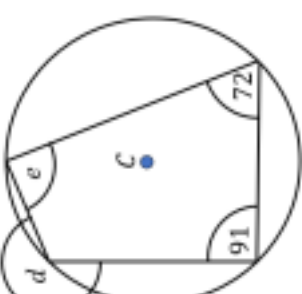
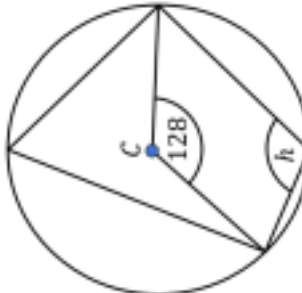
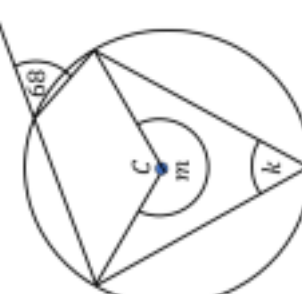
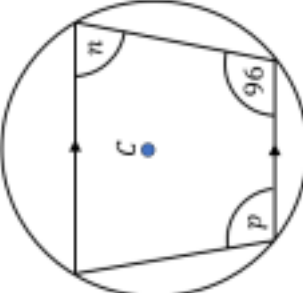
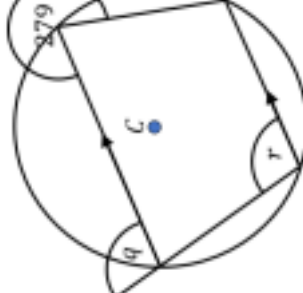
Circle Theorems and Quadrilaterals

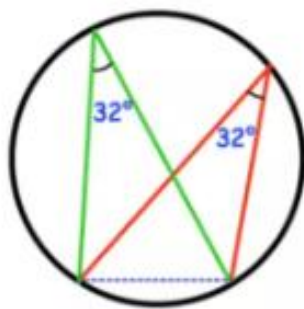
(a) Find the missing angle a. 	(b) Find the missing angles b and c. 	(c) Find the missing angle d. 
(d) What is the relationship between angles e and f? 	(e) What is the relationship between angles g and h? 	(f) Find the value of j. 
(g) Find the value of k. 	(h) Find the values of m and n. 	(i) Find the value of p. 
(j) Find the values of q and r. 	(k) Find the values of s and t. 	(l) Find the values of u and v. 

Angle at the Centre			
(a)	(b)	(c)	(d)
			
(e)	(f)	(g)	(h)
			
(i)	(j)	(k)	(l)
			
Find y in terms of x		Find y in terms of x	

(5) Angles in the same segment

Do now:

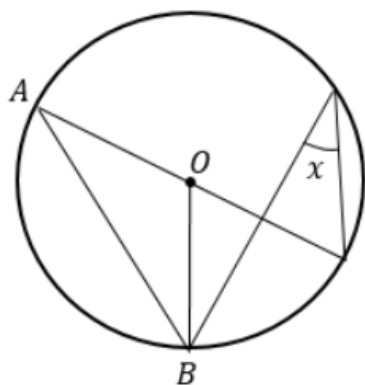
Cyclic Quadrilaterals				
(a)	(b)	(c)	(d)	
				
(e)	(f)	(g)	(h)	
				
(i)	(j)	(k)	(l)	
				Find y in terms of x



The angles in the same segment from a common chord are equal

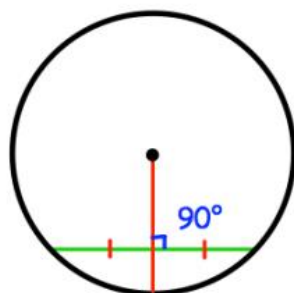
Angles from the Same Segment			
(a)	(b)	(c)	(d)
(e)	(f)	(g)	(h)
(i)	(j)	(k)	(l)

Extension: Determine angle AOB in terms of x



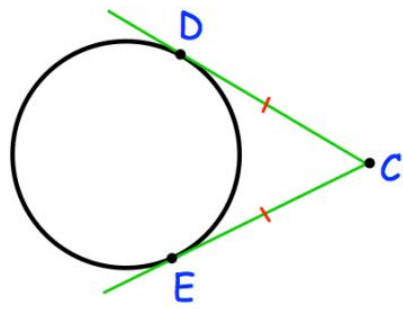
(6) Tangents and radii

Do now:

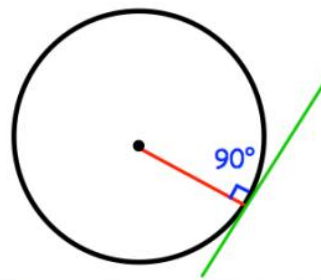


The radius through the midpoint of a chord will bisect the chord at 90°

Perpendicular from the Centre to a Chord			
(a)	(b)	(c)	(d)
(e)	(f)	(g)	(h)
(i)	(j)	(k)	(l)
		Find y in terms of x 	Find y in terms of x



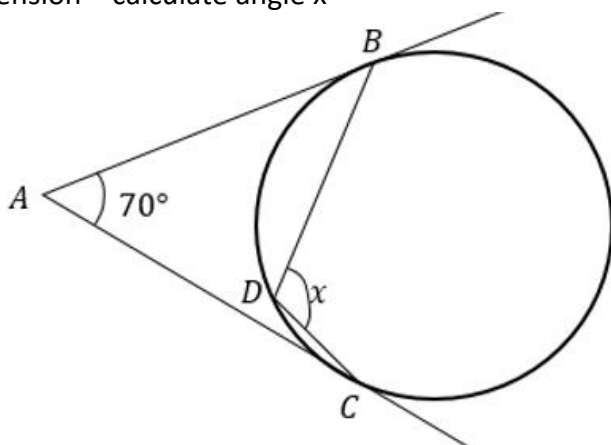
The tangents to a circle from the same point will be equal length



The angle between a radius and a tangent is 90°

Circle Theorems and Tangents			
(a)	(b)	(c)	(d)
(e)	(f)	(g)	(h)
(i)	(j)	(k)	(l)

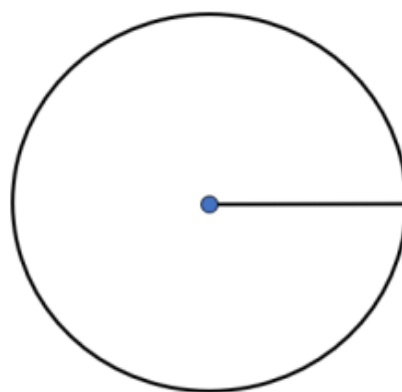
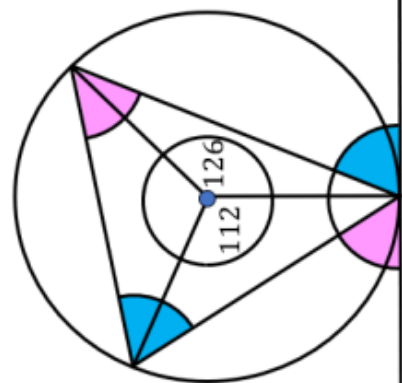
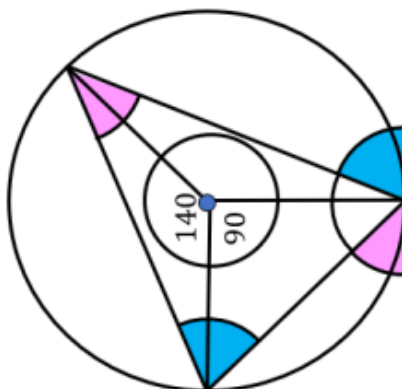
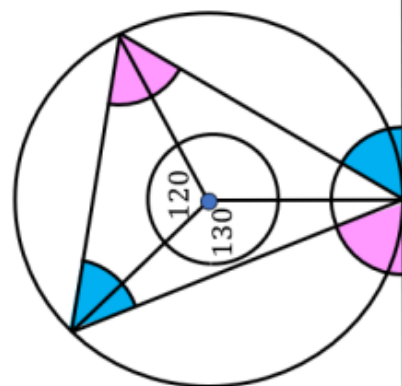
Extension – calculate angle x



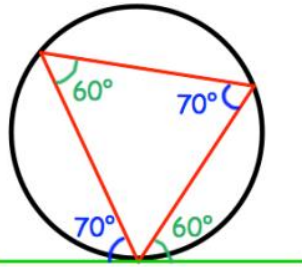
(7) Alternate segment theorem

Do now:

The next three diagrams show three joined isosceles triangles inside a circle with a tangent. Calculate all marked angles and write down what you notice about the shaded angles. In the final diagram, choose your own angles and test your theory.



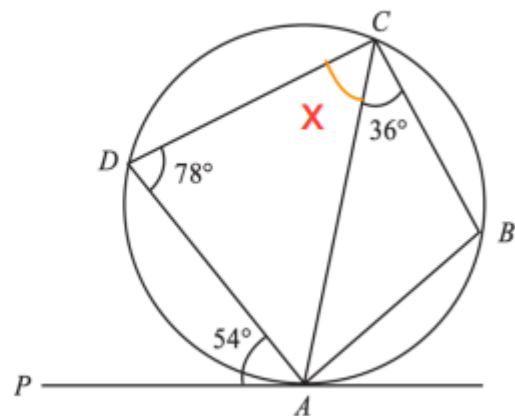
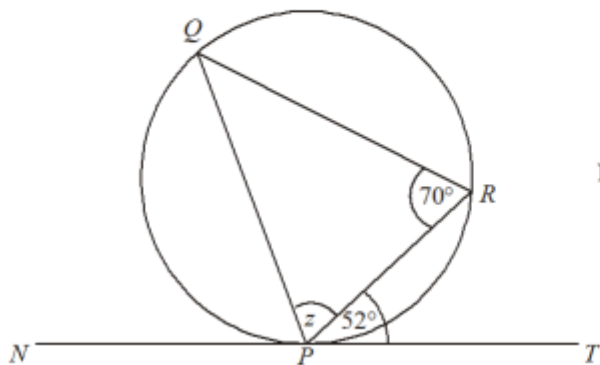
What did you notice?



Alternate segment theorem

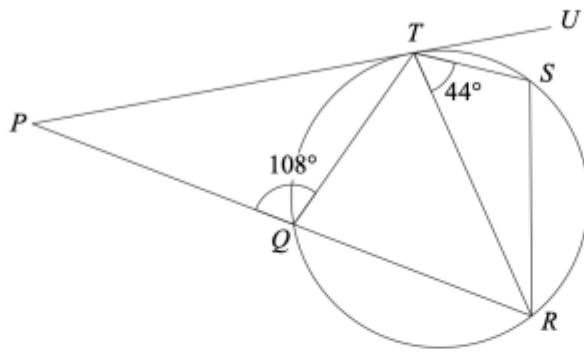
The angle between the chord and the tangent is equal to opposite angle inside the triangle.

Check your understanding (1)



Alternate Segment Theorem			
(a)	(b)	(c)	(d)
(e)	(f)	(g)	(h)
(i)	(j)	(k)	(l)

Exam question



Q, R, S and T are points on the circumference of a circle.

PU is a tangent to the circle at T .

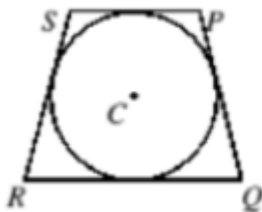
PQR is a straight line.

Angle $PQT = 108^\circ$.

Angle $STR = 44^\circ$.

Work out the size of angle STU .

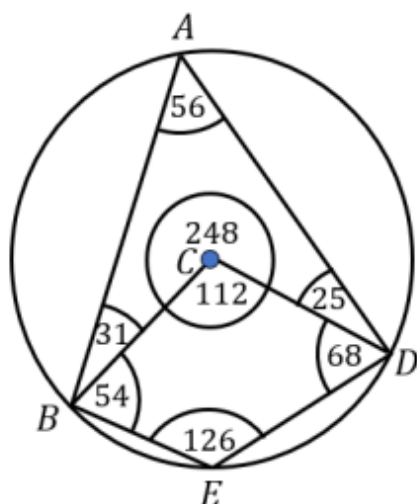
You must give a reason for each step in your working.



[SMC 2012 Q20] In trapezium $PQRS$, $SR = PQ = 25\text{cm}$ and SP is parallel to RQ . All four sides of $PQRS$ are tangent to a circle with centre C . The area of the trapezium is 600cm^2 . What is the radius of the circle?

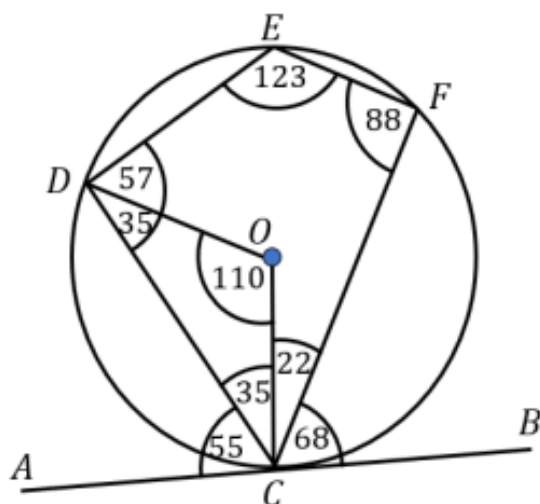
(8) Alternate segment theorem

Do now: Angle notation



Write down the size of the following angles:

- | | |
|----------------------------|-----------|
| (a) ABC | (b) BED |
| (c) BAD | (d) EDC |
| (e) CDA | (f) EBA |
| (g) the obtuse angle DCB | |
| (h) the reflex angle DCB | |



Write down the size of the following angles:

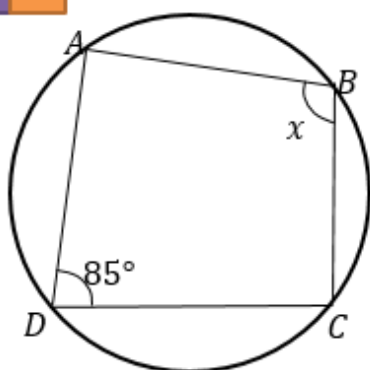
- | | |
|------------|------------|
| (a) DEF | (b) CFE |
| (c) $ OCD$ | (d) $ DCA$ |
| (e) $ BCF$ | (f) $ OCA$ |
| (g) $ DCB$ | (h) $ EDC$ |

From memory list the circle theorems with diagrams.

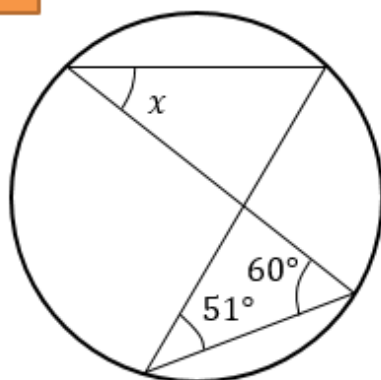
Mixed Circle Theorems with Tangents				
(a)	(b)	(c)	(d)	
Find the size of angle ABD	Find the size of angle EBA	Find the size of angle ABC	Find the size of angle BED	
(e)	(f)	(g)	(h)	
Find the size of angle DEF	Find the size of angle BCD	Find the size of angle DBC	Find the size of angle ABE	
(i)	(j)	(k)	(l)	
Find the size of angle ADC	Find the size of angle EDC	Find the size of angle DBC	Find the size of angle FEB	

Mixed Problems

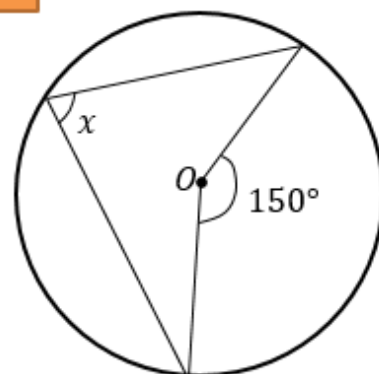
1 a



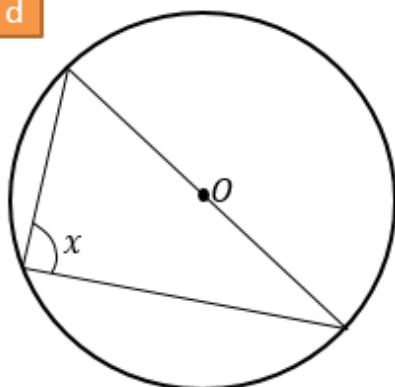
b



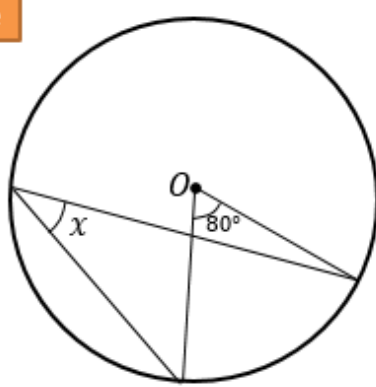
c



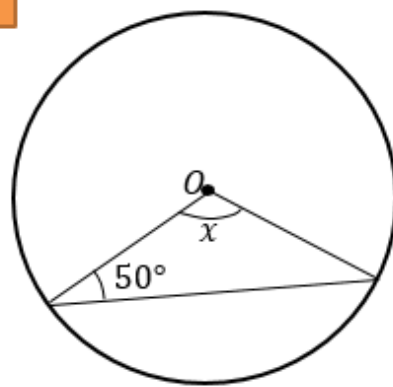
d



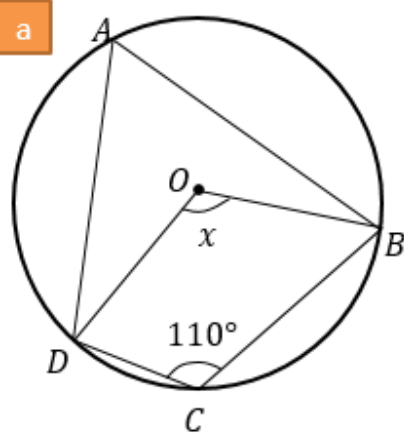
e



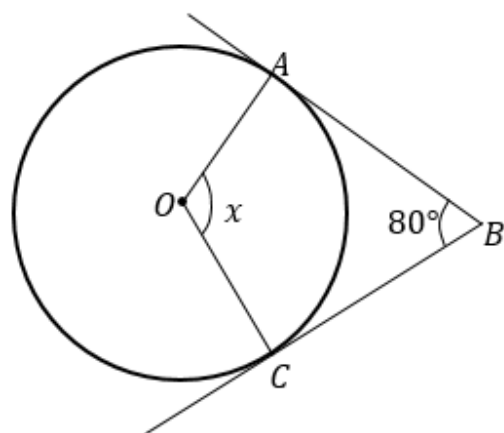
f



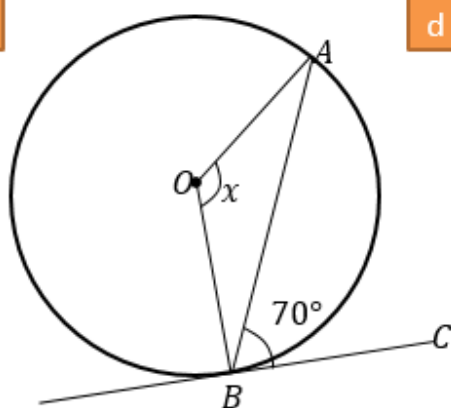
2 a



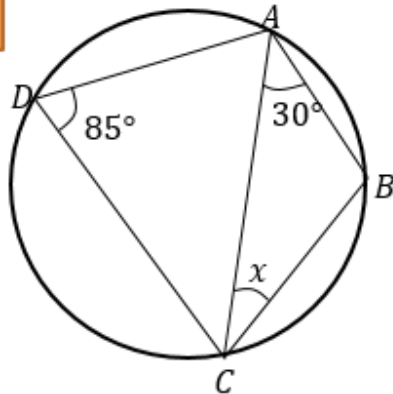
b



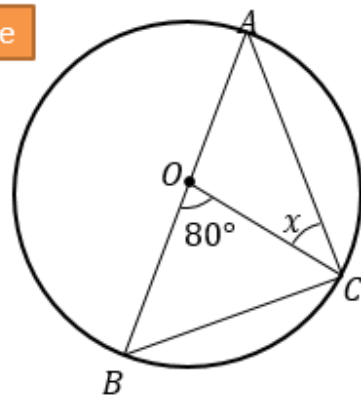
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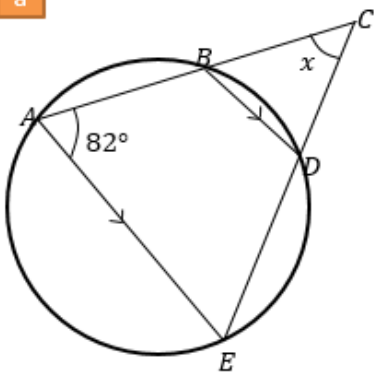
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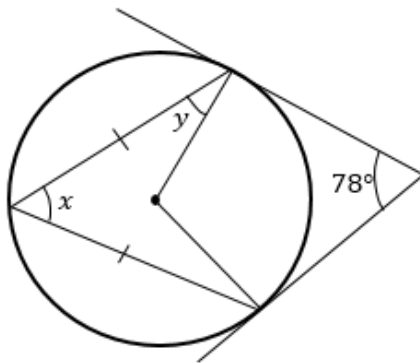
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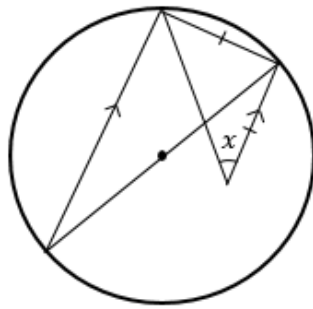
3 a



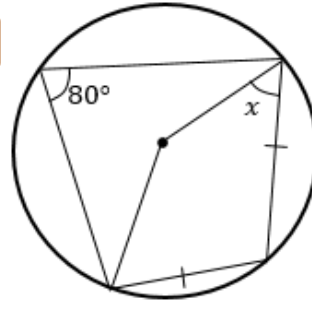
b



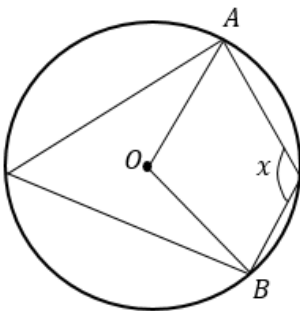
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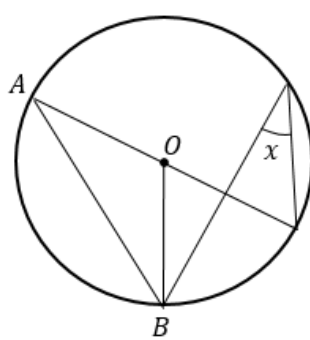
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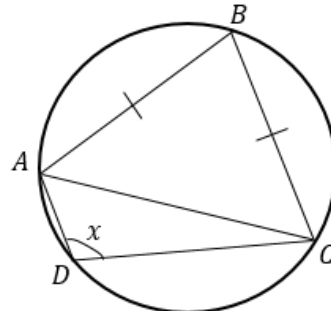
4 Determine each indicated angle in terms of x .



$\angle AOB =$

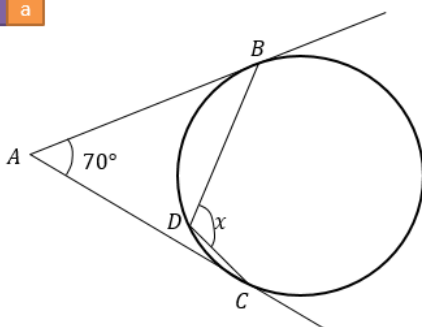


$\angle AOB =$

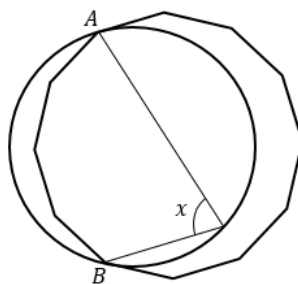


$\angle BAC =$

5 a



b



c

